

ABSTRACT

1 An apparatus for thermal conversion of one or more reactants to desired end
2 products includes an insulated reactor chamber having a high temperature heater such as a
3 plasma torch at its inlet end and, optionally, a restrictive convergent-divergent nozzle at
4 its outlet end. In a thermal conversion method, reactants are injected upstream from the
5 reactor chamber and thoroughly mixed with the plasma stream before entering the reactor
6 chamber. The reactor chamber has a reaction zone that is maintained at a substantially
7 uniform temperature. The resulting heated gaseous stream is then rapidly cooled by
8 passage through the nozzle, which "freezes" the desired end product(s) in the heated
9 equilibrium reaction stage, or is discharged through an outlet pipe without the
10 convergent-divergent nozzle. The desired end products are then separated from the
11 gaseous stream.